

**B. Sc. DEGREE END SEMESTER EXAMINATION MARCH 2018**  
**SEMESTER – 4: CHEMISTRY (COMPLEMENTARY COURSE FOR PHYSICS)**  
**COURSE: 15U4PCHE4.1 – ADVANCED PHYSICAL CHEMISTRY II**  
Common for Regular (2016 Admission) & Supplementary (2015 Admission)

Time: Three Hours

Max. Marks: 60

**SECTION A**

Answer **all** questions, each question carries **1** mark

1. Arrange the following radiations in increasing order of energy: X-Ray, Microwave, IR
2. What is the unit for rate of a reaction?
3. A first order reaction is 75% complete in 20 minutes. Calculate the half-life period of the reaction.
4. What is meant by chemiluminescence?
5. Define conductivity of an electrolyte.
6. Write down the Nernst equation for the EMF of a cell.
7. Define reduction by electronic concept.
8. Determine the oxidation number of Ag in  $[\text{Ag}(\text{NH}_3)_2]\text{Cl}$ . (1 × 8 = 8)

**SECTION B**

Answer **any six** questions, each question carries **2** marks

9. What are auxochromes and chromophores? Give an example for each.
10. State Beer Lambert Law.
11. State Grotthus-Draper law of photochemical activation.
12. What is liquid junction potential? How is it eliminated?
13. How does molar conductance vary with dilution for strong and weak electrolytes?
14. What is Frank Codon principle?
15. Give example of a compound in which oxygen shows (a) +2 oxidation state (b) -2 oxidation state.
16. State any two rules for determining oxidation number. (2 × 6 = 12)

**SECTION C**

Answer **any four** questions, each question carries **5** marks

17. Differentiate between the following pairs of compounds:
  - (a) Ethanol and acetone by IR spectroscopy.
  - (b) Ethyl benzene and styrene by UV spectroscopy
18. The activation energy of a reaction is  $95.32 \text{ kJ mol}^{-1}$  and the value of rate constant at 300K is  $2.5 \times 10^{-5} \text{ s}^{-1}$ . Calculate frequency factor 'A'. ( $R = 8.314 \text{ J/K/mol}$ )
19. Differentiate between phosphorescence and fluorescence.

20. Define order and molecularity of a reaction. How do they differ?
21. Discuss the Faraday's laws of electrolysis.
22. Briefly describe the flash photolysis technique. (5 × 4 = 20)

#### SECTION D

Answer **any two** questions, each question carries **10** marks

23. Write a brief note on rotational spectroscopy. Discuss how it helps in determining the bond length of diatomic molecules.
24. What is meant by first order kinetics? Derive an expression for rate constant and half-life period for a first order reaction.
25. Give an account of conductometric titrations. What are its advantages?
26. How will you determine the pH of a solution using
  - a) Hydrogen electrode
  - b) Glass electrode(10 × 2 = 20)

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